

10 years Berlin Environmental Relief Programme Environmental Projects with Tradition



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Foreword

Dear Reader,

Berlin has already achieved a great deal in terms of climate protection but still has a lot to do: We want Berlin to set an example by becoming an ecological model city and reducing CO₂ emissions by at least 40 percent by 2020 compared to 1990 levels. To achieve this, a transition needs to take place, which is based on three pillars: an increase in energy efficiency, a decrease in energy consumption and the use of renewable energy rather than fossil fuels. The Berlin Environmental Relief Programme (ERP) is the most important tool in implementing our projects in the areas of climate and environmental policies. Using funds from the European Regional Development Fund (ERDF) and the Berlin State budget, ERP is able to fund various projects which are beneficial for the environment.

The European Union provides clear guidelines for the use of ERDF funds: Regional competitiveness and employment must be strengthened and environmental goals are to be incorporated at all levels. In Berlin this has been implemented for the past ten years with the independent Environmental Relief Programme in the responsibility of the Berlin Environmental Administration. Environmental projects have a positive impact on the labour market, on providers of green technology as well as on research and development. And of course, a clean environment increases the attractiveness of the capital city as a whole.

In this brochure, you can see examples of projects that have already benefitted from the funding. Many different types of projects have been funded: building refurbishments to improve energy efficiency, the use of renewable energy, nature protection, research into new climate and environmentally-friendly technologies, noise reduction from traffic – all great ideas and of considerable benefit to the city.

ERP has opened up new paths, in particular through projects to increase energy efficiency, by setting high standards and with several exemplary projects.

You may well be surprised at the diversity of the projects for the environmental protection of our city!

Yours sincerely, Katrin Lompscher

Senator for Health, Environment and Consumer Protection



The Berlin Environmental Relief Programme

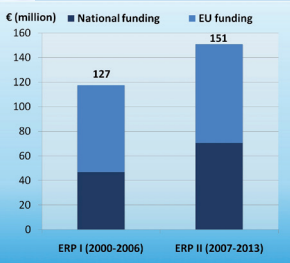
2001 to 2011 – 10 years of the Environmental Relief Programme

Berlin has been developing and implementing funding programmes to improve environmental protection since the 1980s. The aim was in place at an early stage, to link environmental protection with economic and social goals, such as the creation of sustainable jobs and the application-orientated development of green technologies. Industry-specific environmental protection concepts as well as approaches to improve the environment in urban areas were developed and implemented. Since 1990, the funding could be increased with support from the European Structural Funds, in particular the European Regional Development Fund (ERDF), and their effectiveness was increased accordingly. Since 2000, the Berlin consulting agency B.&S.U. mbH has been commissioned to manage and implement the Environmental Relief Programme.



EU display panel at the day-care centre "Entdeckerland" in district Lichtenberg

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ERP funding for Berlin 2000 - 2015

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2001 to 2008 – the Environmental Relief Programme I (ERP I)

Environmental funding in Berlin was fundamentally restructured in 2000 via the Environmental Relief Programme. Six different programmes were summarised under one umbrella; the content was streamlined and approved by the EU in 2001 for the funding period 2000-2006.

The funding now more clearly reflects the basic principle of environmental funding in Berlin: to consider the city as a holistic system. Improvements to the environment have been achieved through an integrated approach in several different areas. For example, projects to improve the energy efficiency of buildings or of industry could be usefully combined with projects to support sustainable local water management systems, increasing the permeability of soil and planting vegetation. When possible, projects were selected that also contributed to the socio-ecological development of the city. Research projects led to green innovation and strengthened the scientific and practical environmental knowledge in Berlin. For the first time, projects for the conservation and development of nature and landscape protection areas could be supported. The decline in the demand for funding from industry and the debate about climate policy led to increased

support of public and non-profit projects to renovate non-residential buildings to improve their energy efficiency. 59 percent of the ERP I funding was allotted to climate protection and energy efficiency projects. The demand for these types of projects is far in excess of the available funding. Projects in education, children and social services in particular, pay off several times over: climate change goes hand in hand with saving energy, reducing operating costs, maintaining and extending social infrastructure, reviving the economy and creating jobs.

2008 to 2015 – the Environmental Relief Programme II (ERP II)

Thanks to its past success, the Environmental Relief Programme has been continued in a similar form in the current funding period 2007-2013 as ERP II and receives around 9 percent of Berlin’s available ERDF funding, which corresponds to 80.4 million Euros. When put together with national funding and own contributions, projects amounting to a total of 160 million Euros will be implemented. Climate change is being taken into consideration more and more and supplemented by studies that should provide answers on how Berlin can adapt to the impact of climate change. A new emphasis has been put on the reduction of emissions from transport, for example to combat noise and air pollution with new traffic concepts. Small and medium-sized companies will continue to be supported financially, such as the introduction of environmental management systems or energy efficiency measures. Sustainable water management remains part of the funding, especially innovative and resource-saving measures for rain water management.

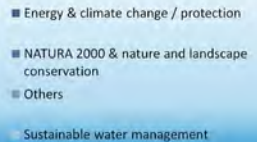
Berlin’s good infrastructure for research and high quality of life give the city clear advantages as a location. ERP provides valuable contributions on top of this. Environmental research funding is concentrated on the areas of sustainable water management, energy efficiency and the use of renewable energies. The funding is however only available to public and non-profit research institutes. The protection and development of valuable areas of nature and the landscape in Berlin and the achievement of the goals of NATURA 2000 are also important building blocks in sustainable economic development, social urban development and last but not least, in reducing the effects of climate change in Berlin.

Distribution of ERP I Funding

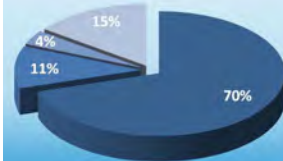


Distribution of ERP I funding 2000-2006

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Distribution of ERP II Funding



Distribution of ERP II funding 2007-2013

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Rainwater Management

In the city of Berlin, it is often the case that more nutrients and pollutants enter water bodies via rainwater drainage than via treated wastewater from sewage treatment plants. It is only possible to achieve the bathing water quality targets in the Berlin water bodies with the help of ecologically and economically sustainable rainwater management. The core elements of this are: in situ infiltration, decentralised or semi-centralised storage, retention and effective purification. This is where the ERP comes in and supports in particular the construction of innovative rainwater purification facilities, which, as a rule, need scientific support during operation. Projects like these add value: natural areas and recreation areas are upgraded, the construction sector is boosted and the competence of the water resources management in Berlin will be strengthened.

In ERP I both small and large facilities were provided with support. Several projects to ecologically and socially renovate buildings or school playgrounds also contained measures for local



Playground design at the secondary school “Georg Christoph” in district Lichtenberg with rainwater courses, landscaping and water features

© Büttner, Büro Büttner

rainwater management consisting of several aspects such as green roofs, improving the permeability of soil, reusing rainwater and in situ infiltration. This led to several good practice examples of schoolyard transformations with integrated rainwater management systems.

In the project “Biesdorfer Baggersee” (a flooded quarry pond) in the Berlin district Marzahn-Hellersdorf, a natural process for treating rainwater was piloted from 2002 to 2009, which had not been previously tried in Germany to the same extent. The facility is centred on a retention soil filter: a reed bed, 18,000 m² in size, specially designed for the rainwater that is to be purified to flow through it. A sand filter and settlement tank are fitted for pre-cleaning. The facility has a high capacity, for example over 95 per cent of the substances that can be filtered are removed, around 30 percent more than by a traditional purification facility. In a research programme, the design of the facility was checked and the substrate was optimised to improve purification performance and efficiency.

The results from the pilot project have been used to improve the planning and design of future facilities. The recreational area “Biesdorfer Baggersee” has been significantly enhanced. Successful protection of water bodies has been combined with effects in



Rainwater pool in the school garden at the grammar school “Schäfersee” in district Reinickendorf
© Büttner, planressort-berlin



Rainwater purification basin at the flooded quarry pond “Biesdorfer Baggersee”
© District Authority Marzahn-Hellersdorf

the economy, in technology and in employment. Based on the positive results, ERP II will support the construction of three further retention soil filter facilities for various types of rainwater catchment areas. Monitoring will also ensure that the facilities are optimised and that lessons are learned for the planning of future facilities.

Installation of a lamella filter for the complete restoration of lake „Fennsee“

Pilot project for a clean lake

At a glance

Project implemented by

District Authority
Charlottenburg-Wilmers-
dorf, Umweltamt

Location

Fennsee
Wallenbergstrasse

Project duration

May 2008 - January 2011

Total expenditure

3,248,093 Euros

ERP Funding

2,376,380 Euros

of which ERDF

1,624,046 Euros

Partners involved in**project (selection)**

Berliner Wasserbetriebe

Funding reference**number**

11111UEPII/1-3

Background

The lake „Fennsee“ in the Berlin district Charlottenburg-Wilmersdorf was created in 1903 as a retention basin for a rainwater catchment area of around 215 hectares in size. The small artificial lake covers an area of about 22,430 m² and is 900 m in length. In 1920, two underground tube filters were installed to mechanically pre-treat the rainwater. However, just one of the two filters remained in operation. These simple tubes filled with rubble were extremely inadequate in filtering the rainwater and were very difficult to clean. The practically untreated rainwater entered the lake and caused significant water pollution. Leaves from trees that were close to the water's edge also added to the problem. Over the years, a thick layer of sludge formed, which led to low levels of oxygen in the water. The decay caused an unpleasant odour particularly during the summer months. The result was the project idea to comprehensively clean up the lake. Between 2005 and 2008, the first measures to improve the water quality were carried out as part of the ERP I. The project will be finished as part of ERP II.

Project Content

The technical concept for the restoration of lake „Fennsee“ has two stages. At the centre of the project is the construction of a rainwater treatment plant. The 90 m long concrete pipes that are still very stable will be used as the structure and a new and innovative lamella filter with supporting technology will be built inside. The submergible dirt particles that are present in rainwater are separated by the sloping, tilting lamella surfaces and removed from the rainwater. The facility is a pilot project. Until now, there has been no experience with this new technology. Planning and construction of rainwater purification facilities is carried out by the public water utilities „Berliner Wasserbetriebe“. There are also supporting measures for the lake itself, including partial desludging, clearing the bottom of the lake and sediment conditioning, which are carried out by the district authority. Since the end of

2010, the lamella filter has been in operation with test runs. Extensive measurements of the cleaning process run in parallel to the optimization of the facility's technology.

Impact

The entry of oxygen-depleting substances into the lake through untreated rain water will be permanently reduced. The objective is to have the lowest possible nutrient content. The daily average oxygen content should be at least 2.5 mg/l, so that rotting is a thing of the past.

It is predicted that a significant quantitative effect will be achieved through the technical measures in both of the stages, including the reduction of phosphorous by 372 kg/a, and of filterable substances by 41,540 kg/a.

The measures, such as dredging, clearing and sediment conditioning will achieve additional qualitative effects.



Restored lake "Fennsee"

© B.&S.U. mbH

Statement

Viola Hügerich ("Umweltamt" of District Charlottenburg-Wilmersdorf)
"In addition to ecological benefits and transferability to other water bodies, I am particularly pleased that the project awoke the interest of the local community in the wastewater treatment facility and the great response from experts."



Concrete pipes with the lamella filter

© B.&S.U. mbH

Green Research and Development

The scientific community is an important economic factor for Berlin. Increasing the competence in Berlin in the area of environmental research is therefore a fundamental component of the ERP. Impulses and new perspectives for the environmental economy in Berlin are being brought about such as the improvement of the competitive situation and the creation and safeguarding of jobs.

At a glance

Project Berlin Solar Plus

Project implemented by

Sulfurcell Solartechnik GmbH

Location

Barbara-McClintock-Str. 11
Berlin Treptow-Köpenick

Project duration

January 2002 - June 2007

Total expenditure

14,500,000 Euros

ERP Funding

6,300,000 Euros

of which ERDF

4,725,000 Euros

Partners involved in

project (selection)

Hahn-Meitner-Institute
(HMI)

Funding reference

number

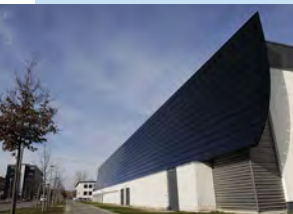
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In ERP I, the focus of the funding was placed on small and medium-sized companies. In cooperation with research institutes in Berlin, projects that increased the development of resource efficiency in processes and products were supported which encouraged companies to harness a significant gain in know-how and of which the results could be marketed. The company Phönix Sonnenwärme AG developed, for example, a small-scale absorption refrigeration unit for solar-powered air conditioning of buildings. The prototype was developed in co-operation with the university Technische Universität Berlin.

Another project from the previous funding period is the development and optimisation of the production process of innovative thin film solar modules by the company Sulfurcell Solartechnik GmbH, which was founded in 2001 from the Hahn-Meitner-Institute (HMI). From 2003, the financial assistance from ERP, in combination with funding from other sources, helped to achieve the use of semi-conductor copper indium disulphide (CIS) in the production of solar modules on an industrial scale. In 2006, the development was acknowledged through the awarding of the „Innovation Prize Berlin-Brandenburg“ and the marketing of the first modules began. Today, the company with its 238 employees belongs to the three leading producers of solar modules using CIS semi-conductors.

In ERP II, the funding of environmental research and development will be continued. The funding is now aimed more towards public and non-profit organizations, such as universities, colleges and Helmholtz centres. The content of ERP II is focused on the funding of projects to increase energy efficiency, the use of renewable energy and to encourage sustainable water management. In doing so, the areas of energy and water technology, integral parts of the Berlin Innovation Strategy, will continue to be provided with effective support.



Solar façade system at the
Ferdinand-Braun-Institute in
Berlin Adlershof

© Sulfurcell

The use of small wind turbines on urban buildings

A small addition to the wind turbine family

Background

The German Federal Government is aiming to increase the share of wind energy in the total energy supply in the coming years, with the focus, however, on large wind power facilities. Small wind turbines with a rated capacity of less than 10 kW have remained a niche market. However interest in them is rising steadily as they are versatile and their potential has not been exhausted. Built-up areas are considered difficult locations for the use of wind energy. This is where small wind turbines could make a contribution to electricity generation.

Project Content

Five suitable sites within Berlin will be selected and small wind turbines will be installed on exposed roofs and monitored extensively over a period of two years. Various parameters will be measured and evaluated, including flow conditions, performance and noise emissions from the turbines as well as static parameters. In addition, economic conditions and licensing requirements will be determined for the use of small wind turbines on the buildings of Berlin.

Impact

To what extent are exposed roofs suitable for the cost-effective operation of wind turbines? What size of turbines is recommendable in terms of wind flow around buildings, energy production and acceptance? Which licensing requirements would apply? Answers will be found, which could form recommendations for authorities and turbine operators. In addition, the relevance of these small wind turbines for climate protection in Berlin will be investigated.

At a glance

Project implemented by

Hochschule für Technik und Wirtschaft Berlin

Project duration

April 2010 - January 2013

Total expenditure

380,000 Euros

ERP Funding

380,000 Euros

of which ERDF

190,000 Euros

Partners involved in**project selection)**

Reiner Lemoine Institute

LWE Windkraft

Gaßner, Groth, Siederer &

Coll.

Funding reference**number**

11243UEP11/2



The small wind turbine on the Lise-Meitner-School-Centre will be included in the monitoring programme

© B.&S.U. mbH

OXERAM 2 – New combinations of methods to treat wastewater

Will Berlin have wastewater clean enough to swim in?

At a glance

Project implemented by

KompetenzZentrum
Wasser Berlin gGmbH
(KWB)

Location

Wastewater Treatment
Plant Ruhleben

Project duration

January 2010 -
January 2013

Total expenditure

1,295,339 Euros

ERP Funding

1,295,339 Euros

of which ERDF

647,670 Euros

**Partners involved in
project (selection)**

Berliner Wasserbetriebe
(BWB)

Veolia

Technische Universität
Berlin, Department of
Water Quality Control

**Funding reference
number**

11245UEPII/2

Background

Every day, a large amount of treated wastewater from large-scale wastewater treatment plants enters the waterbodies in Berlin. The treated wastewater looks clean, but still contains significant amounts of nutrients, in particular phosphorous, that pollute the ecology of the water. It has not been possible to swim in some lakes in Berlin for a long time, particularly in the summer. The River Spree may have less water in the future and this will mean that the water quality will deteriorate. In line with the EU Water Framework Directive, in the future the aim will be to ensure good water quality with low amounts of phosphorous (< 0.09 mg/l). In Berlin, this objective should be achieved through an advanced effluent treatment with a four-stage treatment process. The associated costs should be kept as low as possible.

Project Content

The research project OXERAM 2 will develop cost and energy-efficient methods for advanced wastewater treatment. The ambitious aim of the project is to reduce the phosphorous content in the effluent from wastewater treatment facilities to concentrations of less than 0.05-0.120 mg/l. At the same time, pathogenic microorganisms should also be removed from the treated wastewater. Through using appropriate cleaning technology, the bathing water quality in Berlin surface waters will be secured for the future. To do this, the research project has three priorities. Two of these are from wastewater technology. At the large-scale wastewater treatment facilities in the district Ruhleben innovative pilot technology, such as membrane filters with pre-ozonation and disk filters are being tested practically. Laboratory investigations at the Technische Universität Berlin support these trials. In addition to that, the third priority is to carry out a comparative evaluation of the technologies.

Impact

A tool to help decision-making is being developed. This will enable the responsible bodies of the Land of Berlin to select technologies and locations taking cost-benefit aspects into account. In the long term, through the use of these wastewater technologies, the water quality in Berlin will significantly improve with permanently low phosphorous levels. The water ecology will be stabilised in a positive way. The pollution from microorganisms will be reduced. Maybe it will even be possible to really go swimming in the River Spree without giving it a second thought.



Pilot disk filter facility with microfiltration

© KWB

Microfiltration equipment

© KWB



Statement

Regina Gnirß (Berliner Wasserbetriebe)
"The project OXERAM is testing the joint research activities of Berlin scientists in the field of advanced wastewater treatment in terms of their suitability for practical use. OXERAM lays important foundations for future decisions on technology and investment at Berliner Wasserbetriebe."

Using Terra Preta Technology in the Botanic Garden – TerraBoGa

Waste turned into valuable “black earth”

At a glance

Project implemented by

Freie Universität Berlin
Dept. Organic Environmental Geochemistry

Location

Berlin Steglitz-Zehlendorf

Project duration

September 2010 - August 2013

Total expenditure

985,534 Euros

ERP Funding

985,534 Euros

of which ERDF

492,767 Euros

Partners involved in project (selection)

Botanic Garden and Botanical Museum Berlin-Dahlem

Palaterra GmbH

HATI GmbH

Funding reference number

11260UEP11/2

Background

The Botanic Garden Berlin produces around 750 m³ of green waste, 350 m³ of pruning waste, 230 m³ of grass cuttings and 150 m³ of wood. Much of this organic material is still unused and is disposed of in a way that is both energy and cost intensive. The sewage from employees and the annual 300,000 visitors is also flushed away in the usual manner as wastewater. In contrast, around 350 m³ of compost, aggregates and soil has had to be bought in each year. The project idea that grew from this situation was to develop an innovative solution to complete the resource cycle, using the Botanic Garden as an example. All of the nutrient resources in the Botanic Garden will be incorporated to produce extremely fertile potting soil.

Project Content

Everything that previously ended up on the compost heap or was disposed of expensively will, in the future, be turned into nutrient-rich black earth in small-scale facilities. The secret of the future “Berlin black earth” is the application of old Terra Preta technology, which was used centuries ago in the Amazon area by the natives. Terra Preta (Portuguese for black earth) is a black soil created by humans with a much higher capacity to store water and nutrients than soils that have developed naturally. The high fertility of Terra Preta is due to more than 10 percent chemically and biologically inert carbon (charcoal-like material). The innovative research and development project has a zero-emission approach as well as an almost complete waste management cycle.



Organic biomass compost in the Botanic Garden Berlin

© FU Berlin

Impact

By producing Terra Preta substratum, the resource cycle within the Botanic Garden can be completed. A first rough estimate shows significant potential in the reduction of CO₂ by producing and using Terra Preta. In the Botanic Garden, the annual CO₂ emissions can be reduced by up to 420 t, as the black earth acts as an unusually stable CO₂ store. In the current composting and mulching procedures, as a comparison, only 50 t of CO₂ are stored. The project therefore makes an important contribution towards climate protection. These soils can simultaneously store water and nutrients particularly well.

The Terra Preta technology will be brought to a broader audience through the creation of a show garden and an experimental garden with an exhibition in the Botanic Garden. The research results can also be used for other suitable locations.

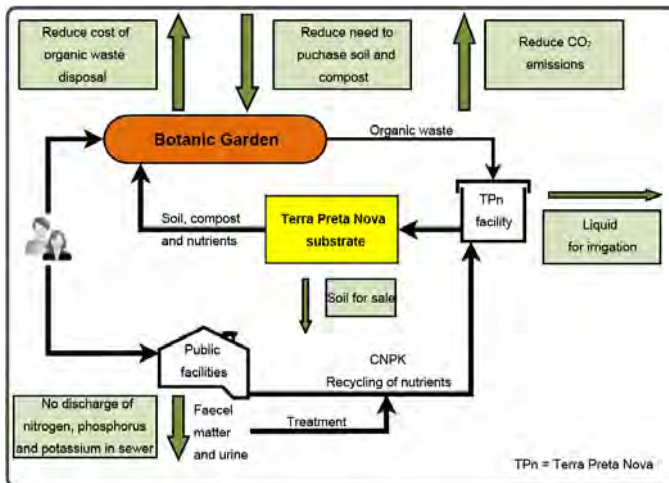


Ingredients for Terra Preta: coconut shells, pruning waste, biochar, wood (clockwise from left)

© FU Berlin

Statement

Heiko Pieplow (Federal Ministry for the Environment, Expert of Project Advisory Board)
"If it is possible to transfer the results of the Terra Preta research into practice, completely new possibilities would open up for using resources in urban areas sustainably. Fertile soils can be created through the long-term enrichment and storage of carbon in the soil with this innovative procedure. This promotes climate protection, the conservation of biodiversity and new business models. Thanks to the Terra Preta project, the Botanic Garden Dahlem could develop into an important competence centre, both in Germany and abroad, in the field of urban farming, which will be of great benefit to the city of Berlin."



Complete waste management cycle in the Botanic Garden

© Lars Mielke, edited by R. Wagner and B.&S.U. mbH

Studies on the impact and consequences of climate change for Berlin



Valuable biomass

© Louis Back

At a glance

Project implemented by

Senate Department for Health, Environment and Consumer Protection, Berlin, Unit III B

Project duration

January 2008 - May 2009

Total expenditure

140,658 Euros

ERP Funding

131,658 Euros

of which ERDF

70,329 Euros

Partners involved in project (selection)

Witzenhausen-Institut für Abfall, Umwelt und Energie GmbH
ICU-Ingenieurconsulting Umwelt und Bau
BSR, BWB, Districts of Berlin, Vattenfall Europe AG

Funding reference number

11042UEPII/3

In the face of climate change, Berlin has to develop adaptation strategies and instruments, in addition to measures to save CO₂. With the assistance of ERP, studies on the impact and consequences of climate change are being carried out for Berlin in the current funding period and the foundations laid for an energy and climate concept for Berlin. On the basis of reliable information and assessments, strategies will be developed to prevent or reduce the consequences of climate change. A first step is made by studies on the potential for renewable energy in Berlin. The studies are accompanied by projects from other ERP funding priorities, such as research into the economic feasibility of small wind power facilities and a pilot project on the use of heat from wastewater.

Concept for the use of biomass waste as a renewable energy source: composting and climate protection

Biomass such as green waste, leaves, wood, grass clippings, animal manure, grease, sewage sludge, food waste, etc. is currently being treated and used in various different ways in Berlin. Open composting, thermal utilisation and fermentation are the standard methods used. Open composting wastes a significant amount of energy and has a large impact on the climate, because the heat produced is lost to the atmosphere and harmful climate gasses, such as CO₂, methane and nitrous oxide are released.

Biomass can be used more effectively as a source of renewable energy. A concept has been developed in the research project with several methods for the high quality and climate-friendly utilisation of all the biomass produced in Berlin. First, the existing material flow management system was recorded in detail. Alternative possibilities for the utilisation of the existing material flows were shown in three scenarios and evaluated in the context of their relevance to the climate. Measures were specified for the optimisation of both the material utilisation as well as energy recovery of the bio-waste. The study includes an economic analysis and shows the anticipated costs.

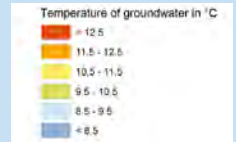
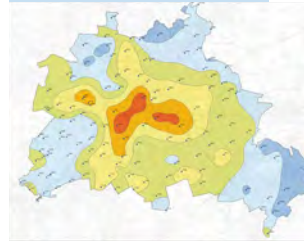
Depending on the scenario, it is predicted that a CO₂ reduction of up to 230,700 t/a will be achieved. The results of the biomass study are incorporated directly into the waste planning and climate protection policies in Berlin.

Study on the potential use of geothermic resources in Berlin: Harnessing geothermal energy

In recent years, Berlin has built a variety of facilities for the use of geothermal energy. In order to consistently and sustainably use geothermal energy and to assess its contribution to the future energy supply, systematic investigations are needed to discover the geothermal potential in Berlin.

Which geothermal resources are present in the city and how much of these can be used? The study will address these questions. Furthermore, in order to be able to better evaluate the use of geothermal energy and its impact on groundwater, the temperature changes will be investigated and modelled.

The information obtained will be presented in the form of maps using a geographical information system. In doing so, information such as heat conductivity, heat loss and groundwater temperature, can be accessed easily and used in the planning and authorisation of geothermal facilities.



Groundwater temperature 20 m below ground surface in 2010

© SenGesUmV, edited by B.&S.U. mbH

At a glance

Project implemented by
Senate Department for Health, Environment and Consumer Protection, Berlin, Unit II E

Project duration
February 2009 - December 2011

Total expenditure
300,000 Euros

ERP Funding
300,000 Euros
of which ERDF
150,000 Euros

Partners involved in project (selection)
Geophysicist
Andreas Henning
Bidding consortium
G.E.O.S./HGC

Arcadis Deutschland GmbH

Funding reference number

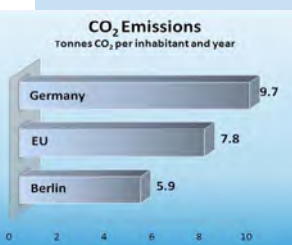
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Energy and Climate Protection



Berlin's climate protection targets for 2050, compared to 1990

© B.&S.U. mbH



Annual CO₂ per capita emissions (based on final energy consumption)

© B.&S.U. mbH

From an early stage Berlin has been aware of its responsibility as an attractive city to live in and designed the Environmental Relief Programme accordingly as part of the ERDF funding programme. Since 2001, projects to protect the climate, increase energy efficiency and use renewable energy have been intensively funded, especially in the renovation of non-residential buildings to improve their energy efficiency. Well over 65 percent of the ERP funds, i. e. five to six percent of the ERDF funding in Berlin, is being put to good use in this area. In March 2010, Berlin presented these results from the ERP as part of the "European Sustainable Energy Week" (EUSEW) in Brussels.

The projects funded by the ERP show how the ambitious goals in climate protection and energy savings of around 85 percent by 2050 can be achieved in public buildings, because public authorities have a particular responsibility. For this reason, the funding requirements are particularly high. For example, in the renovation of existing building stock, much stricter requirements are demanded than the legally required minimum standards for comparable newly constructed buildings. Compliance is monitored by programme implementing agency B.&S.U. mbH and supplemented by quality control procedures such as thermographic analyses and blower door tests. After implementation, energy consumption levels have to be recorded usually for a minimum of five years. In addition, the use of new technical innovations is encouraged, for example the use of vacuum insulation panels, highly efficient ventilation technology, cold and heat saving materials (phase change materials) and the use of heat pumps. Significant effects were also shown through the special renovation to improve the energy efficiency of listed buildings.

The targets can be achieved

90 percent of the funded projects achieve primary energy savings or reductions in CO₂ emissions of more than 40 percent, 50 percent achieve savings of more than 60 percent. Savings of more than 80 percent are achieved by 14 percent of the projects. The investments are economically viable, because the savings have offset the investment before the lifetime of the component has been reached.

The greatest potential for savings is in the efficient use of fossil fuels. No other area can link the targets of increasing energy efficiency and the use of renewable energy more effectively than the area of heat. The use of renewable energy is therefore the most integral part of energy efficiency projects in the ERP. In ERP II alone, around 80 facilities for the use of renewable energy are being funded. Due to the sufficiently high incentives for photovoltaic energy from the Renewable Energy Sources Act (Erneuerbare-Energien-Gesetz, EEG), ERP funding has been limited mostly to solar thermal, biomass, and geothermal energy sources as well as heat from wastewater.

Increasing the energy efficiency of small and medium-sized companies plays a small role at present due to low demand. Nevertheless, primary energy savings of more than 30 percent can be achieved also in this area.

In renovating non-residential buildings to improve their energy efficiency, the focus is placed on schools, daycare centres, youth recreation facilities, sports facilities, indoor swimming pools and other important public buildings. The objectives of climate protection and economical use of energy as well as the European support from ERDF can be shown particularly well in buildings such as these due to their high public perception. Maybe you have already seen one of these buildings?



Presentation of the ERP results at the EUSEW in Brussels:
Lothar Stock (SenGesUmV),
Venelina Varbova (REC),
EU Commissioner
Connie Hedegaard,
Dr. Armand Dütz
(B.&S.U. mbH),
Danuta Hübner (MEP)
© Weiss, SenGesUmV

Energy-efficient refurbishment of the Montessori Primary School in Pankow

A lesson in climate protection and energy efficiency

At a glance

Project implemented by
Karuna e. V.

Location
Hadlichstrasse 2
Berlin Pankow

Project duration
April 2009 -
November 2011

Total expenditure
1,010,390 Euros

ERP Funding
909,351 Euros

of which ERDF
505,195 Euros

**Partners involved in
project (selection)**
BAKA e. V.

Technische Universität
Dresden
Institut für Bauklimatik
GFF Gewerbliche Akademie für Glas-Fassaden
und Fenstertechnik
Karlsruhe

BAM Bundesanstalt für
Materialforschung und
Prüfung Berlin

**Funding reference
number**

11116UEPII/4-2

Background

The former parish hall, which was built in 1899, is today classified as a listed building and has been used as a primary school in Berlin, Pankow, since 2007. The non-profit organisation Karuna e.V. runs the school, the after-school club and a daycare centre. At the moment, the school has 67 pupils, but this is rising and is predicted to be 170 in 2012. In addition to the Montessori methodology, a particular priority is put on the integration of children from socially-disadvantaged families. Providing support and advice to parents are therefore part of school life. Old windows and a dilapidated heating system contributed to the building's very poor energy performance. The project was developed as a learning project with the title "Lernen in alten Mauern" (learning within old walls) and was meant to raise awareness of climate protection right from the start.

Project Content

The actions taken to renovate the building can be used as an example of how to renovate a listed building to improve its energy efficiency. The aim is to achieve the maximum level of energy saving effects while simultaneously protecting the character of the protected building. This means that essential insulation has to be installed from the inside. Hereby innovative materials are being used. Alongside the new roof, the floor panels are also being insulated. The windows are being replaced by new thermally insulated windows according to Passive House standards. A particular highlight is the switch of heat supply to using renewable energy: heat will be supplied by a heat pump with geothermal energy. Another innovation is the planned use of an ambient air controlled ventilation system with heat recovery in the classrooms. In the area of building services, investment will be made in a central building control system and in the optimisation of the lighting.

Impact

The refurbishment will set a new building standard for listed buildings using renewable energy. For this reason, the project was selected as a good practice example by the Bundesarbeitskreis Altbauerneuerung e. V. (BAKA) and entered into the Best Practice Database www.eneff-schule.de.

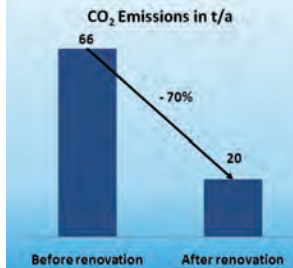
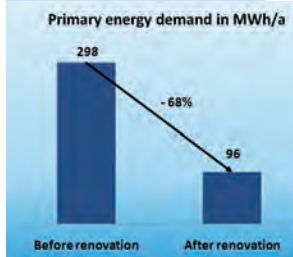
The target energy standard is around 40 percent below the minimum standard of a comparable new building (National Energy Saving Regulation, EnEV 2007). Overall, a reduction in the annual primary energy consumption of around 67 percent (200 MWh/a) will be achieved and 46 t CO₂ emissions per year will be avoided, which corresponds to the annual CO₂ per capita emissions of eight residents of Berlin.

The renovation also reduces the operating costs that will be up to 20,000 Euros per year lower. The project will have a positive effect on employment, especially in the local construction industry. Nine jobs will be safeguarded, followed by the potential creation of twenty new jobs.



Building before renovation

© BAKA e. V.



Impact of the project at the Montessori School on climate protection

© B.&S.U. mbH



Interior insulation and dry lining of walls

© BAKA e. V.



Thermal image of a partly renovated building

© BAKA e. V.

Energy-efficient building renovation of the daycare centre Wolgaster Strasse in Wedding

A new face for an old daycare centre

At a glance

Project implemented by

Kinder in Bewegung
(KiB) gGmbH

Location

Berlin Wedding

Project duration

November 2008 -
March 2010

Total expenditure

631,817 Euros

ERP Funding

568,635 Euros

of which ERDF

315,908 Euros

Partners involved in**project (selection)**

Architekturbüro BBI B
GmbH Berlin

Funding reference**number**

11073UEP/4-2

Background

The daycare centre on Wolgaster Strasse was built in 1980/1981 as a one and two storey building in Berlin, Wedding. The non-profit organisation „Kinder in Bewegung“ (KiB gGmbH) manages this daycare centre as well as others and places a special focus on children’s movement, perception and communication. It is based on a special educational approach of a kindergarten with children who love to move. At present, the daycare centre looks after children from the age of eight months old. The daycare centre is situated in a difficult social environment. About 75 percent of the children are of migratory background.

The structural condition of the building was very poor which caused a high rate of energy consumption. In this poorly insulated building it was getting increasingly uncomfortable. Thus the idea came up to comprehensively renovate the building to improve its energy efficiency, in combination with utilising solar energy from a large solar thermal facility on the roof.

Project Content

The daycare centre building is structurally complicated with various ledges, eaves and landings and although it posed a great challenge for the architects, it received a complete energy-efficient renovation in the ERP project. The renovation took place despite difficult circumstances as the daycare was still operating throughout.

Primary energy demand in MWh/a



CO₂ - Emissionen in t/a



Impact of the project at the daycare centre Wolgaster Strasse on climate protection

© B.&S.U. mbH

The following measures were carried out:

- Insulation of the roof and façades with perimeter insulation,
- Replacement of windows and exterior doors,
- Modernisation of the heating system,
- Installation of a 69 m² large solar thermal facility on the roof.

A special feature of the project is that the solar thermal facility is for both heating and hot water.

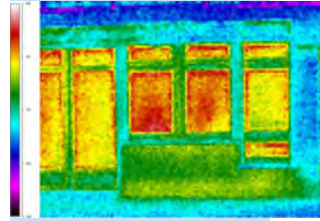
Impact

The energy-efficient renovation led to a clear reduction in primary energy consumption that exceeds the legal requirements of the national Energy Saving Regulation (Energieeinsparverordnung, EnEV 2007). An annual primary energy consumption level of 323 MWh was achieved. This corresponds to a reduction in CO₂ emissions of around 50 t/a, and the annual per capita emissions of around eight residents of Berlin. Significant savings in operating costs are also expected. The daycare centre was able to successfully safeguard its special educational services in a difficult area on a long-term basis thanks to the renovation which improved its energy efficiency.



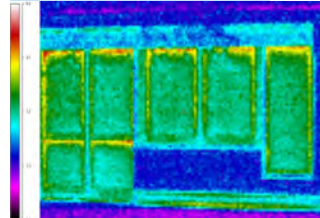
Daycare centre Wolgaster Strasse after renovation

© B.&S.U. mbH



Thermal image of a window before renovation

© KiB gGmbH



Thermal image of a window after renovation

© KiB gGmbH



Detailed photo of the window façade

© B.&S.U. mbH

Energy-efficient building renovation of the daycare centre „Akazieninsel“ in Marzahn

A jewel in Berlin's largest "Plattenbau" estate

At a glance

Project implemented by
Jugendwerk Aufbau
Ost e. V.

Location
Allee der Kosmonauten 73
Berlin Marzahn-Hellersdorf

Project duration
March 2009 -
September 2010

Total expenditure
743,340 Euros

ERP Funding
669,006 Euros

of which ERDF
371,670 Euros

Partners involved in project (selection)

PK Architekten und
Ingenieure
Ingenieurbüro Kleeberg

Funding reference number
11053UEPII/4-2



Daycare centre "Akazieninsel" before renovation
© Fromm, TraBant GmbH

Background

The three-storey building was constructed in "Plattenbau" style, made of prefabricated concrete slabs (type WBS70) in 1977/1978. The children's daycare centre, which took its name from the nearby acacia wood, is operated by Jugendwerk Aufbau Ost e. V. It caters for 190 children from eight weeks old to school entry age. Following the renovation of almost all of the housing blocks in this high density area, the unrenovated daycare centre was a deplorable sight. It was definitely time to tackle the renovation to improve the building's energy efficiency, especially in view of the high amount of energy and money needed to heat the building. Despite the building's environmentally friendly heat supply via district heating from combined heat and power generation (CHP), the level of primary energy consumption was high with 431 MWh/a and associated CO₂ emissions of 113 t/a.

Project Content

As the daycare centre was already supplied with advantageous district heating from CHP, the main task of the project was to optimise the building's shell. The façade was fitted with a thermal insulation system, the flat roof was insulated and the windows and doors replaced. Compared with the requirements for each building component of the national Energy Saving Regulation (Energieeinsparverordnung, EnEV 2007), improvements as high as up to 30 percent were achieved.

In addition, the heat loss of the building was reduced through structural improvements (reducing the amount of unnecessary glazed areas, incorporation of the terraces in line with the exterior walls). Ventilation systems for heat recovery and solar panels on the roof completed the energy concept.

Impact

Today, the daycare centre is a jewel in the estate. Children, parents and carers are happy to be there at all times of the year. The centre has drastically reduced its operating costs by around 12,000 Euros a year and these funds can be put to good use for childcare. The newly glazed balconies enrich the educational service provided for smaller groups and especially for disabled children. Here, a studio, an exercise room for babies and a relaxation room were created, financed by the operating organisation.

The project contributes to prevent 76 t/a CO₂ from being emitted, which corresponds to the annual CO₂ per capita emissions of 13 residents of Berlin. It truly is an investment in the future, the extent of which would not have been possible without the assistance of the ERP. The project is a good practice example of the renovation of daycare centres of the same prefabricated model. There are still many of these in Berlin.



The renovated daycare centre with solar panels

© B.&S.U. mbH

Primary energy demand in MWh/a



CO₂ Emissions in t/a



Impact of the project at the daycare centre "Akazieninsel" on climate protection

© B.&S.U. mbH

Energy-efficient renovation of the children's, youth and family centre FEZ Berlin

A popular meeting place for young and old is wrapped up warmly

At a glance

Project implemented by

District Authority
Treptow-Köpenick

Location

An der Wuhlheide 197
Berlin Treptow-Köpenick

Project duration

December 2009 -
March 2013

Total expenditure

8,038,072 Euros

ERP Funding

4,019,036 Euros

of which ERDF

4,019,036 Euros

Partners involved in project (selection)

Senate Department for
Urban Development
Senate Department for
Education, Science and
Research
FEZ Berlin
Innovationspark Wuhl-
heide Management mbH
(IMG)

ARGE Thoma Architekten
IFHE Ingenieure

Funding reference number

11049UEPII/4-2

Background

The FEZ is a centre for children, youths and families that caters for the whole of Berlin, irrelevant of age or culture. It has a group of buildings that cover a large area in the district Köpenick and has been used for over 30 years. A million people visit the FEZ each year and it is one of the largest non-profit centres for recreation and leisure in the whole of Europe. In 2005, the first discussions about the renovation took place as the energy performance, particularly of the building shell, were poor.

The project idea was developed with the aim of significantly exceeding the requirements of the national Energy Saving Regulation (Energieeinsparverordnung, EnEV, 2007) for a comparable new building: a high quality renovation.

Project Content

The project includes a comprehensive renovation of the main building to improve its energy efficiency. With a net floor area of 34,993 m², the building has a very complicated layout. As well as a hall for events with a stage, a restaurant and a kitchen, there are also offices, a swimming pool, a sports hall, a foyer, a cellar and washrooms. The following measures are being implemented to increase the energy efficiency:

- High quality insulation of the whole façade and the roof while preserving the architectural wood panelling on the façade to a large extent,
- Replacement of all of the windows and exterior doors,

Primary energy demand in MWh/a



CO₂ Emissions in t/a



Impact of the project at the FEZ on climate protection

© B.&S.U. mbH

- Installation of a solar thermal facility for the hot water in the swimming pool showers,
- Installation of a ventilation system with heat recovery and heating optimisation.

It is expected that the renovation will last three to four years. The planning of the project is already at an advanced stage. The construction is about to begin in 2011.

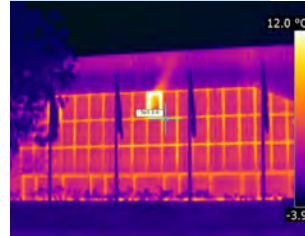
Impact

The impact of the high quality energy efficient renovation will be able to be seen and not just the environment will see the rewards; the FEZ operators will benefit from a cut in costs too. The main building's future energy demand will be 43 percent lower than the requirements of the Energy Saving Regulation (Energieeinsparverordnung, EnEV, 2007). It is predicted that CO₂ emissions will be reduced by up to 1,036 t/a, which means an annual reduction in CO₂ per capita emissions of 176 residents of Berlin. This means that the ERP project is helping the much-loved institution to survive in the long term.



Children's festival in the FEZ

© Lindner, IMG



Thermal image of the façade and windows of the swimming pool before renovation

© BBP Bauconsulting mbH



FEZ main building façade and windows of the swimming pool

© BBP Bauconsulting mbH

Statement

Wilfried Trutz (Senate Department for Education, Science and Research)

"The renovation of the FEZ Berlin to improve its energy efficiency is an important project that has been funded by the ERP II programme, both in terms of climate protection as well as for education and the funding of leisure activities. It is a good practice example of sustainable urban development and an investment in the future. It is our responsibility to leave an intact, ecological, social and economic environment for our children and our children's children to grow up in."

Energy efficient renovation of the family centre and homeless project on Nostizstrasse

A refurbished building for all

At a glance

Project implemented by

Evangelic Heilig
Kreuz-Passion Parish

Location

Nostizstr. 6/7
Berlin Friedrichshain-
Kreuzberg

Project duration

January 2009 - October
2010

Total expenditure

1,019,142 Euros

ERP Funding

889,380 Euros

of which ERDF

509,571 Euros

Partners involved in

project (selection)

STATTBAU GmbH
Architekturbüro Rebel
Büro Lozancic und
Partner

Funding reference

number

11070UEP11/4-2

Background

The parish house of the parish of Heilig Kreuz-Passion in the Nostizstrasse was built in 1964/65 as a six-storey corner house with a hall. It is used as a family centre and a housing project for homeless and has a hospice character. In the heart of the district Kreuzberg, it transcends several barriers to bring people from many different backgrounds together, counteracting the exclusion of less well off and disabled people.

As well as providing advice and various types of activities for families and local residents, the church also provides respite accommodation for ill and dying homeless people.

Project Content

The building and hall were completely refurbished to improve their energy performance. As well as high quality insulation of the roof and façade, windows with three-layer glazing and new doors were installed and the heating, ventilation and control systems were optimised. The power-hungry decentralised hot water system was replaced by a centralised gas-powered system that is supported by the sun collectors on the roof. In addition, a new ventilation system with heat recovery was installed in the parish hall and the lighting was optimised.

While the ERP project was renovating the building to improve its energy efficiency, the centre's own funds were used to carry out further improvements including structural alterations in the basement, the replacement of the hygiene and kitchen facilities and the construction of a small extension to the building.



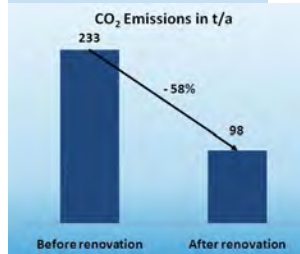
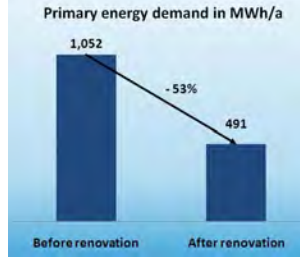
Building before renovation

© STATTBAU GmbH

Impact

The primary energy savings from this project are 561 MWh/a (around 30 percent better than the initial level). This means a reduction of CO₂ emissions of 136 t/a, which corresponds to the annual CO₂ per capita emissions of 23 residents of Berlin. Moreover, a reduction in operating costs of around 29,800 Euros was calculated.

But those are just the effects that you can count. The social impact is also significant as you can see in the community project “Living together in the Neighbourhood” (“Gemeinsam Leben im Kiez”).



Impact of the project “Nostizstrasse” on climate protection

© B.&S.U. mbH



...after the renovation

© B.&S.U. mbH

Statement

Peter Storck
(Pastor of the Heilig Kreuz-Passion Parish)
“It is fantastic that a family centre for the local community and a home for ill, former homeless people have been created under one roof. It is even better that we have finally been able to ensure our long-term future and to be an example for others who would like to renovate their building in a climate friendly way.”

Energy efficiency in the Tropical Greenhouse

A challenge in construction and horticulture

At a glance

Project implemented by

Freie Universität Berlin
Service Institution
Botanic Garden

Location

Königin-Luise-Str. 6 - 8
Berlin Steglitz-Zehlendorf

Project duration

January 2006 -
December 2008

Total expenditure

9,953,043 Euros

ERP Funding

9,652,633 Euros

of which ERDF

4,975,938 Euros

Partners involved in project (selection)

HAAS Architekten BDA
Technical Department of
the Freie Universität
Various Senate Depart-
ments of the Land of
Berlin

Various monument
protection authorities

Funding reference number

10876UEP/W7

Background

The 100-year old tropical greenhouse at the Botanic Garden in Berlin is one of the largest and most impressive free-standing greenhouses in the world. In temperate latitudes such as ours, tropical greenhouses are subject to extreme thermal loads. Due to the high level of humidity inside, the building tends to deteriorate more quickly than normal. Fine cracks in the acrylic glass were stopping sunlight from getting through. Larger cracks, weathered seals and poor insulation allowed essential heat to escape. It was necessary to carry out a comprehensive renovation of the building's shell and technical facilities to preserve the listed building for the general public and for science. The renovation would also reduce the enormous level of energy consumption.

Project Content

The tropical greenhouse was modernised with innovative heating, climate, control and lighting systems. The building's exterior was also renovated. In addition to the construction, energy and listed status of the building, botanic aspects also had to be taken into consideration (e. g. most light possible for the more than 4,000 plants). The glass façade was completely replaced. The frames for joining the façade elements are hollow and have water flowing through them. This "radiator effect" ensures that the façade acts as an insulator to the outside and also ensures that the panes do not steam up as much.

The heating system is a combination of air, floor and façade heating and uses district heating. Two 16 m high ventilation towers, disguised as trees, circulate the air in the greenhouse. In addition, the lighting was modernised and made energy-efficient and the utilisation of rainwater was expanded.



The tropical greenhouse after renovation

© Altenkirch, HAAS
Architekten BDA

Impact

Energy consumption has been halved and the project has made an important contribution to climate change. Compared to the initial situation, 1,750 MWh primary energy and 445 t CO₂ are being saved each year, which corresponds to the CO₂ per capita emissions of 75 residents of Berlin. Furthermore around 1,700 m³ drinking water are being saved. This is also reflected in the operated costs which are reduced by around 100,000 Euros a year.

The project had an effect on employment in the regional construction industry. At the Freie Universität Berlin, five jobs were safeguarded. Access to the building is now barrier free.



Tropical greenhouse after renovation

© Altenkirch, HAAS Architekten BDA

Primary energy demand in MWh/a



CO₂ Emissions in t/a



Impact of the project at the tropical greenhouse on climate protection

© B.&S.U. mbH



Ventilation towers disguised as tropical trees

© B.&S.U. mbH

Wastewater heat utilisation for the swimming pool on Sachsendamm

Energy from wastewater heats a swimming pool

At a glance

Project implemented by

Berliner Wasserbetriebe
Unit Research &
Development

Location

Sachsendamm 11
Berlin Tempelhof-
Schöneberg

Project duration

September 2010 -
August 2012

Total expenditure

635,700 Euros

ERP Funding

381,420 Euros

of which ERDF

317,850 Euros

**Partners involved in
project (selection)**

Berliner Wasserbetriebe
Berliner Bäder-Betriebe
Ingenieurbüro Lang

**Funding reference
number**

11251UEPII/4-1

Background

As part of the climate protection agreement with the Senate, the public water utilities Berliner Wasserbetriebe (BWB) have been looking for ways to use renewable energy sources. This is how the new innovative idea came about to utilise the heat energy from the wastewater in the BWB's sewage system. After examining its own sewer system and potential heat users in the vicinity, the BWB have identified several locations where the heat supply in the sewers and the potential for the heat to be used are at the correct ratio to one another. As a first location, they chose a section of the sewers that were technically suitable near to a swimming pool run by the Berliner Bäder-Betriebe (BBB). The operation of the swimming pool ensures that there is a consistent demand of heat throughout the year. Heat consumption and heat supply fit together very well from an energy point of view.

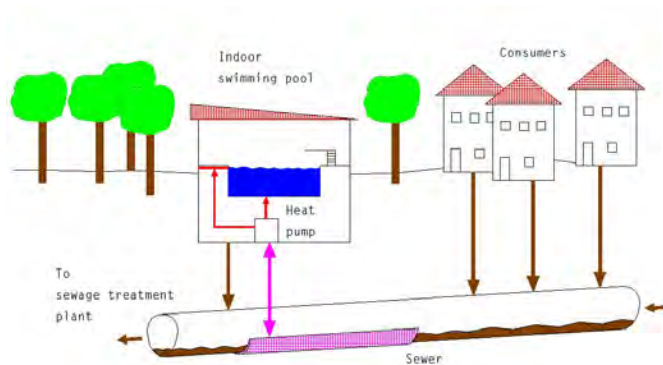
Project Content

The plan is to build a plant for wastewater heat utilisation for the sport and teaching swimming pool of the BBB in the district Schöneberg. The wastewater heat from the adjacent sewer will be used as a renewable source of energy in the swimming pool. Similar to the use of geothermal energy, this is done using a heat pump. Rather than using the earth's heat, the heat source in this case is the warm wastewater in the sewer with an all-year-round temperature of 10-20° C. An innovative sewer heat exchanger will be installed directly into the sewage pipes and extracts the required heat from the wastewater. Using an efficient wastewater heat pump, the basic heat requirements of a section of the facilities will be covered. It is likely that this will include the underfloor heating and heating the swimming pool itself as these can both be achieved with low flow temperatures. The existing gas boiler will be kept and will cover the remaining heat demand peaks (bivalent configuration).

The BWB will provide heat to the swimming pool operator BBB at cost-price for over ten years. The operating data of the innovative technology will be evaluated in a study carried out by the BWB.

Impact

Through a comparison of alternatives, primary energy savings of more than 539 MWh/a, and a reduction in CO₂ emissions of 89 t/a (annual CO₂ per capita emissions of 15 residents of Berlin) are predicted. The operating results of the innovative technology to use the heat from wastewater are meant to be used in further locations in Berlin.



Principle of wastewater heat utilisation

© Waschnewski, BWB



Accessible sewer system
© BWB

Statement

Jan Waschnewski
(Project manager, Berliner Wasserbetriebe)
"The heat exchanger in the sewer system is the cost driver of this forward-looking technology. To get an economical energy recovery, it is required that the pilot projects evaluate the technical risks as well as the potential for optimisation."

Biomass heating system fuelled by wood chips

Heating in the natural way with wood

At a glance

Project implemented by

Berlin City Cleaning
Company

Location

Gradestrasse 81
Berlin Neukölln

Project duration

June 2009 - October 2010

Total expenditure

1,023,333 Euros

ERP Funding

511,667 Euros

of which ERDF

511,666 Euros

Partners involved in**project (selection)**

BLS Energieplan GmbH
Berlin

Vattenfall Europe AG

Funding reference**number**

11106UEPII/4-1

Background

The Berlin City Cleaning Company (Berliner Stadtreinigungsbe-triebe, BSR) is a publicly owned organisation with duties that include street cleaning and waste disposal. With the installation of a biomass heating system, the BSR intend to generate the ma-jority of the heat energy needed at their property on Gradestrasse in a climate-friendly way. The previous production of heat from fuel oil will be greatly reduced. To achieve this goal, wood waste will be processed to make it suitable for its use in the biomass heating facility.

Project Content

Until now, heat has been generated using two fuel oil-fired boi-lers. The installation of a wood-fired heating system with 850 KW nominal heat capacity including a flue gas cleaning system (multi-cyclone and electrofilter) should replace around 70 percent of the existing demand for fuel oil. Most importantly, the basic heat load can be covered using a sustainable energy source.

The company Vattenfall supplies the appropriate quality of wood chips that is needed for firing. The supply concept is that Vatten-fall receives all of the old Berlin Christmas trees from BSR for pro-cessing and in return provides a continuous supply of wood chips of untreated wood from the region throughout the whole year – only certified material. Thanks to the short distance that this fuel has to be transported, the project's primary energy balance is hardly affected by its delivery.



Wood chips –
certified material

© B.&S.U. mbH

Impact

The project helps to reduce emissions that are harmful to the climate as heating with wood is practically CO₂-neutral. Furthermore, wood chips are subject to much smaller fluctuations in price than oil, which means they are more reliable for planning business operation.

Replacing fuel oil with wood and the efficiency of the wood-fired system enable the reduction of primary energy demand by almost 60 percent compared with the start of the project. This means an annual primary energy saving of around 2,723 MWh/a. This corresponds to a reduction in CO₂ emissions of around 885 t/a, which is the same as the annual CO₂ per capita emissions of 150 residents of Berlin. The savings in operational costs are around 100,000 Euros a year.



Wood chip-fired heating system at the BSR property on Gradestrasse

© B.&S.U. mbH

Statement

Senator
Katrin Lompscher at the
official opening of the
facility on 12.01.2011
*"The biomass heating
system will produce cli-
mate-friendly heat from
renewable energy. Bio-
mass is almost CO₂-neu-
tral when it is burnt,
because only as much CO₂
is released as was stored in
the plant during growth."*

Reducing emissions from traffic

At a glance

Pilot Project Noise reduction

Project implemented by

Senate Department for
Health, Environment and
Consumer Protection
Berlin
Unit III D

Project duration

April 2009 - October 2011

Total expenditure

201,000 Euros

ERP Funding

100,500 Euros

of which ERDF

100,500 Euros

Partners involved in project (selection)

District Authority Fried-
richshain-Kreuzberg
District Authority
Charlottenburg-
Wilmersdorf
District Authority Mitte

Funding reference number

11181UEP11/6-2

Statement

Andreas Scholz-Fleisch-
mann (BSR Management
Board)

*"Thanks to the funding
from ERP I for gas-powered
refuse collection vehicles,
we have had the chance to
test this technology on a
large scale since 2002 and
have been able to reduce
particulate emissions in
Berlin ahead of European
legislation. Our practical
experience has led to fur-
ther developments from
the producers of vehicle
and motor technology."*

The pollution of our environment through the traffic is evident everywhere in Berlin. The reduction of transport emissions, including noise, diesel exhaust, particulate matter, NO_x and CO₂ emissions is therefore a key objective of the urban environment and transport policy. Environmentally friendly mobility is an important prerequisite for the economic development and sustainability of urban areas.

The ERP programme supports Berlin-based companies and public organisations to have environmentally-friendly mobility, for example by funding

- the development and testing of clean transport technology,
- improved mobility management and traffic control systems and
- environmentally friendly modes of transport.

In the ERP there are, however, limits on the funding of such projects. Funding for the purchase of environmentally friendly vehicles, for example, or other means of transport is very limited.

Nevertheless, the Berlin City Cleaning Company (Berliner Stadtreinigungsberriebe, BSR) could be assisted with the purchase of 50 refuse collection vehicles powered by natural gas and the construction of their own natural gas fuelling station with around 1.5 million Euros from ERP I.



Noise reduction in
Brandenburgische Strasse

© Kaptain, SenGesUmV

There are two pilot projects to reduce emissions from transport in the current ERP II programme:

Pilot Project – Noise reduction on four sample roads

On the basis of the Berlin Noise Action Plan, four sections of road (Brandenburgische, Drontheimer and Dudenstrasse as well as Prinzenallee), are being investigated in terms of noise and environmentally friendly traffic flows with a redesign of street space that is temporary for the project time. The project involves changing the road markings to reduce the road lanes and to create bikes paths. It also includes the creation of centre islands for pedestrians. The project is backed up by a scientific study and once it has been completed, it will be decided which ideas will be constructed permanently.

Pilot Project – Fitting Berlin busses with equipment to reduce NOx emissions

In Berlin, many main roads exceed the legal threshold for nitrous oxide (NOx) emissions. This is particularly the case for roads with high amounts of bus traffic. For this reason, the project will test whether buses fitted with additional filter technology can contribute to the reduction of NOx emissions.

As a public institution, the Berliner Verkehrsbetriebe (BVG) has to set a good example. With assistance from ERP II, two types of bus are fitted with NOx filters and put to the test with scientific back-up.

If the project is successful, the BVG intend to equip 98 more buses with the technology.

At a glance Pilot Project NOx Filter

Project implemented by
Berliner Verkehrsbetriebe (BVG)

Project duration
2011

Total expenditure
146,266 Euros

ERP Funding
84,688 Euros
of which ERDF
73,133 Euros

Partners involved in project (selection)
Senate Department of Health, Environment and Consumer Protection
Berlin
Unit III D
HJS Emission Technology GmbH & Co. KG

Funding reference number
11261UEP11/6-2



New technology for Berlin buses
© BVG

Statement

Dr. Sigrid Evelyn Nikutta
(Chairwoman of the Management Board of BVG)
“Sustainability and protecting the environment are very important for the BVG. New technologies to help us reach these goals are always welcome if they can withstand the difficult transport conditions in Berlin and are economically feasible for the company.”

Environmental Management Systems

At a glance

Project implemented by

micro resist technology
Gesellschaft für
Chemische Materialien
Spezieller
Photoresistsysteme mbH

Location

Berlin Treptow-Köpenick

Project duration

November 2010 -
October 2011

Total expenditure

19,500 Euros

ERP Funding

7,800 Euros

of which ERDF

7,800 Euros

Partners involved in

project (selection)

matec GmbH

Funding reference

number

11318UEPII/5

Statement

Gabi Grützner
(Managing Director,
micro resist technology
GmbH)

"It was a given from day one that our products must be made without harming our staff or the environment. We would like to improve even more through the implementation of an environmental management system. We want to protect our environment more systematically, not just from our 'gut feeling'"

Despite the difficult economic environment, between 2001 and 2008, 60 companies (amongst others the housing association Wohnungsbaugesellschaft Stadt und Land) implemented an environmental management system (EMS) with the support of ERP I or took part in the ÖKOPROFIT® project. An EMS can help to identify a business's environmental impact and the best way to optimise it for the environment and economically. EMSs improve the competitive position of the Berlin economy. ERP II provides an additional financial incentive to small and medium-sized companies to encourage them to implement an environmental management system.

The implementation of an environmental management system according to DIN EN ISO 14001

The company micro resist technology GmbH has already installed a quality management system and is intending to also install an EMS according to DIN EN ISO 14001. The company develops, produces and sells materials for microelectronic components, semiconductors and MEMS products. The EMS ensures the competitiveness and helps to attract new customers.

An advisory company assists with the introduction of the EMS and provides support in the form of training. It is predicted that certification will take place as soon as October 2011.

Nature and landscape conservation – NATURA 2000

Nearly half of Berlin is made up of parks, forests, gardens, open spaces and water areas that offer a variety of rare and endangered species such as the peregrine falcon, white tailed eagles, beavers and otters a habitat. To protect this wealth of Berlin, about 15 per cent of the Berlin area has been placed under nature and landscape conservation status. The European Union has set the target of conserving the biological diversity and aims, with NATURA 2000, to create a continuous network of specially protected areas across Europe.

The abundance of green spaces, rivers and lakes make Berlin particularly attractive. The city has large areas for recreation and green oases that help to stabilise the city's climate, even on hot summer days.

Over the last ten years, the ERP has provided funding to safeguard this abundance and wealth. A variety of different projects have already been implemented. Through removing construction rubble from the fen „Teufelsmoor“ in district Köpenick it could develop back to being a fen. The former „Rieselfelder“ (fields irrigated with sewage) in Hoberechtsfelde in the north of Berlin that were characterised through a low water level and high levels of pollutants, were re-supplied with water and remediated with special soil treatment methods. A landscape that is both varied and characterised by water was created that offers a good habitat for many animal and plant species. In the Wuhlheide new habitats could be created through the demolition of the old Soviet barracks and the public park „Volkspark Wuhlheide“ was extended. In addition, trees have been planted on many roads in Berlin to improve the city's climate and the scenic path „Havelhöhenweg“ between Heerstrasse and the city beach „Strandbad Wannsee“ was restored.

Even in the current funding period, interesting projects are being implemented that you might not have expected in Berlin. Just like sheep in „Landschaftspark Herzberge“, beavers can now call the city their home: A resting place was built on the River Spree in district Kreuzberg for these highly protected animals, so they can pass through Berlin. And who knows which other rare animals will make their way from the North to Berlin, after the River Panke has been restored...



District Wuhlheide: view of the recultivated area

© B.&S.U. mbH



Section of the scenic path „Havelhöhenwanderweg“

© District Authority Charlottenburg-Wilmersdorf

Fort Hahneberg

Fortress ruins develop naturally

At a glance

Project implemented by

District Authority
Spandau
Amt für Naturschutz,
Grünflächen und
Umweltschutz

Location

Berlin Spandau

Project duration

April 2003 -
September 2007

Total expenditure

2,140,975 Euros

ERP Funding

1,926,842 Euros

of which ERDF

1,605,731 Euros

**Partners involved in
project (selection)**

Werkstatt Zwei
ProLine Concept
Büro Ökologie und
Planung
Umweltconsulting
Dr. Hoffmann

**Funding reference
number**

10365UEP/OÜ5

Background

Fort Hahneberg and its surroundings were in a deep sleep for 40 years within the restricted area at the border between East and West Germany. The flora and fauna around the listed fortress ruins could develop to be unique and diverse. The fortress is one of the most significant winter quarters for numerous strictly protected bat species. Parts of the area belong to the European nature protect network NATURA 2000. Since the Berlin wall came down, the area has been used as a recreational area due to its unique and varied landscape and its military history.

The aim of the project was to protect and develop the area sustainably and in the long term. The greatest challenge to the project was to resolve the conflict between the protection of the listed ruins, its use as a recreation area and species and habitat conservation.

Project Content

Enhancement and development activities were carried out to protect the various biotopes including dry grass, mixed forest with rare elms and ravine forest that is unique to the region. Their success was evaluated using a vegetation ecology monitoring study. Expert reports were created to identify the characteristics of the area and to adequately take them into account. It is important that the protected biotopes are not damaged by numerous visitors so a path system was put into place. The northern part of the ravine forest is, for example, off bounds for visitors and thus has been left to develop naturally. A newly constructed viewing platform with two footbridges allows the visitor to get a good view. A nature trail explains the natural treasures of the area around the fortress.

Impact

The individual measures contributed to increasing the biodiversity found in the area, to sustainably safeguard the NATURA 2000 site and to establish a nature and landscape protected area. Although tours of the fortress are forbidden in winter due to the specially protected bat population, the conflicts about the use of the area were resolved and the appeal of the area for recreation increased as a whole.



Viewing platform at Fort Hahneberg

© Archiv Werkstatt Zwo



The area of the Fortress Ruins "Fort Hahneberg"

© Archiv Werkstatt Zwo



Statement

Senator
Katrin Lompscher at the opening of the nature reserve on 04.07.2007
"An important habitat for protected plant and animal species has developed within a military restricted area. This treasure was uncovered thanks to everyone who was involved and ERP funding. The ruins can now be visited by all."

Urban agriculture “StadtLandWirtschaft Herzberge” in Lichtenberg

Sheep are taking over the city

At a glance

Project implemented by

District Authority
Lichtenberg
Amt für Umwelt und
Natur

Location

Berlin Lichtenberg

Project duration

October 2008 -
March 2013

Total expenditure

3,570,000 Euros

ERP Funding

3,066,631 Euros

of which ERDF

1,785,000 Euros

Partners involved in**project (selection)**

Fugmann Janotta –
Büro für Landschafts-
architektur und Land-
schaftsentwicklung
IB Baugrund Stralsund
Henningsen Landschafts-
architekten
Büro Aquaconstruct
The Nature and
Biodiversity Conservation
Union (NABU)

**Funding reference
number**

11034UEP1/7

Background

A large area composed of wasteland, business areas, residential areas and green spaces extends around the Evangelic hospital „Königin Elisabeth Herzberge“ in Berlin, Lichtenberg. The fallow land has not been used for the last 10 to 15 years and was extremely overgrown in many places, as well as being affected by vandalism and waste dumping. This negatively impacted the economic development of the entire site. Nearby companies and organizations complained about the increasing dilapidation and often responded by relocating. On the other hand, flora and fauna which are unique to the city region in their diversity have been thriving in these areas. For example, in the wetland biotopes in the north, a wide variety of strictly protected amphibian species were able to settle, such as the great crested newt, the European green toad and the common water frog.

Project Content

The goal of the project was the revitalisation of the disused land and the opening of the site for the city public in consideration of the particular nature conservation needs. In order to carry this out, many different types of measures are being implemented on the site, which is the size of 75 football fields. Grazing areas for sheep, habitats for strictly protected amphibian species and a recreation area for the residents of Berlin will be developed. To make this possible, railway sidings from a former marshalling yard are being removed, the newly created grazing areas will be connected with paths, fenced in and equipped with roofed shelters for the animals. New wetland areas are being created in order to connect the habitats of the present amphibian populations. In order to further support these populations, measures to improve water quality are also being carried out in the ponds located in the north.



Sheep in the project area

© B.&S.U. mbH

Impact

This project sets an example for how urban wasteland can be sustainably developed by linking recreation, agriculture and nature conservation.



Former district heating system transformed into a beehive in the landscape park "Herzberge"

© Henningsen Landschaftsarchitekten BDLA



State Secretary Prof. Dr. Hoff at the awards ceremony

© B.&S.U. mbH

Statement

State Secretary Prof. Dr. Benjamin-Immanuel Hoff, speaking at the awards ceremony "Ausgewählter Ort 2010" (selected places 2010) in the competition "365 Orte im Land der Ideen" (365 places in the country of ideas) at the open house day on 18.08.2010

"Agriculture in the city and the prospect of being able to designate an area of 50 hectares as an additional nature or landscape reserve – it's no wonder that this project has received recognition on a national level and was given an award as a 'selected place' in the country of ideas project."

Outlook

In light of global warming, cities face the challenge of developing sustainable climate protection policies and of proving that they can be implemented. Berlin is aware of its particular environmental and political responsibility as a European city and capital of Germany.

The city's climate and environmental protection policies are aimed at:

- permanently reducing the energy demand in buildings,
- aligning the city's energy supply with the sustainability requirements and
- adopting measures at an early stage for the adaptation to the inevitable consequences of climate change.

The future of the Environmental Relief Programme depends on the extent to which Berlin receives funding from the European Regional Development Fund (ERDF), and which conditions the European Commission specifies for the funding. In 2014, a new funding period for Structural Funds will begin. The environmental administration will advocate the continued use of funding from the ERDF for environmental projects in Berlin in accordance with the efforts of the European Union.

In the context of the European Cohesion Policy, the creation and implementation of integrated development strategies, such as in the areas of innovation, environmental protection and urban development play a crucial role. The continuation of the ERP could help in managing these challenges.

Climate protection, resource conservation and resource efficiency (also in the development of land and residential areas), nature and landscape protection, preservation of biodiversity (protection of species), reduction of emissions caused by traffic, including noise, and good water quality – all of these are goals that should be further pursued with the support of Structural Funds. They result in much more than the stimulation of innovation, green technology, environmental protection and urban development. In addition, the projects of the Environmental Relief Programme also contribute to environmental education and the facilitation of sustainable lifestyles.

Berlin will do everything in order to continue its long-standing tradition of environmental support – and to remain an attractive and green city worth living in, both now and in the future.

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B.&S.U. mbH

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